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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/817,339 | 03/27/2001 | Yoshihiro Hama | P20338 | 8905 |
| 7055 | 7590 | 05/25/2004 | EXAMINER | |
| GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191 | | | PHAM, HAI CHI | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2861 | |

DATE MAILED: 05/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,339

Applicant(s)

HAMA ET AL.

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>06/05/01</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koide (U.S. 5,181,137) in view of Maruyama (U.S. 6,346,957).

Koide, an acknowledged prior art, discloses a multi-beam scanning device comprising a light source that emits a plurality of light beams (the light source having a plurality of light emitting units 100-103), a polygonal mirror (2) that deflects the light beams emitted by said light source to scan, and an optical system (reflecting mirrors) that converges the deflected light beams on a plurality of objects to be scanned (drum-shaped photoreceptors 50-53), the plurality of objects being arranged on a side, with respect to said polygonal mirror, in which said light beams scan, from a position closer to said polygonal mirror to a position farther from said polygonal mirror in order (see Figs. 4 and 5B), said optical system including a plurality of optical path turning systems

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(reflecting mirrors 130, 130a, 130b, 131, 131a, 131b, 132, 132a, 132b, 133, 133a, 133b) that turn optical paths of the deflected light beams, respectively, and each of said optical path turning system including a plurality of reflection surfaces (a set of three mirrors being used for reflecting each of the light beams toward the corresponding drum), the numbers of the reflections surfaces of all of said optical path turning systems being odd numbers (three reflections surfaces for each of the light beams).

With regard to claim 13, Koide further teaches the numbers of the reflections surfaces of all of said optical path turning systems being the same (three reflections surfaces for each of the light beams).

However, Koide fails to teach the optical path lengths of the optical paths of the deflected light beams being the same.

Maruyama discloses a multi-beam scanning apparatus comprising a light source (25) emitting a plurality of light beams, a polygon mirror (29), an optical system including a set of f- θ lenses (30) and a plurality of optical path turning system (formed by the separating mirror 31 and the respective mirrors 22a-22d) for turning optical paths of the deflected light beams, respectively, toward the surface to be scanned of the photoreceptor drums (24a-24d), wherein the optical path lengths of the optical paths of the respective deflected light beams are kept equal to one another (col. 7, lines 1-6) such that similar size spots are obtained on each photoreceptor.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to arrange the optical system of Koide such that the optical path lengths of the respective light beams are kept equal to one another as

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taught by Maruyama. The motivation for doing so would have been to obtain similar size spots on each photoreceptor and thus to enable correct formation of images on the respective photoreceptor.

With regard to claims 2-3 and 14, Koide further teaches:

- an f- θ lens including a first lens (3a), a second lens (3b) and a plurality of third lenses (40-43), all the deflected light beams passing through said first lens and said second lens, the deflected light beams passed through said first lens and said second lens passing through respective ones of said plurality of third lenses said plurality of optical path turning systems receiving said plurality of light beams that emerge from said second lens and directing the received light beams to said plurality of third lenses respectively (see Fig. 5B),
- each of the optical path turning systems having at least a first reflection surface and a second reflection surface.

4. Claims 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koide in view of Maruyama, as applied to claims 1-3 above and further in view of Tanaka et al. (U.S. 6,473,105).

Koide in view of Maruyama, which further at least one of the optical path turning systems including a prism having two reflection surfaces (Maruyama: Fig. 2C), a prism and a mirror (Maruyama: prism 32 and separating mirror 31). However, Koide in view of Maruyama, fails to disclose the optical turning system having a first reflection surface and a second reflection surface, wherein the third optical path defined between the

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second reflection surface to the object to be scanned located closest to the polygon mirror passes a position between the polygon mirror and the first lens (claim 4), intersects with the first optical path defined between the second lens and the first reflection surface (claim 8), and wherein the beam proceeding along the second optical path is directed on an opposite side of the objects to be scanned with respect to the first optical path (claim 9).

Tanaka discloses a multi-beam scanning apparatus comprising a light source (not shown) emitting a plurality of light beams (91-94), a polygon mirror (220), an f- θ lens system including a first and second lenses (230 and 240) and a plurality of third lenses (251-254), an optical system including a plurality of optical path turning system (formed by the plurality of reflection mirrors 26) for turning optical paths of the deflected light beams, respectively, toward the surface to be scanned of the photoreceptor drums (21-24), wherein the third optical path defined between the second reflection surface to the object (photoreceptor 21) to be scanned located closest to the polygon mirror passes a position between the polygon mirror and the first lens, intersects with the first optical path defined between the second lens and the first reflection surface, and wherein the beam proceeding along the second optical path is directed on an opposite side of the objects to be scanned with respect to the first optical path (see Figs. 1 and 2).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to arrange the optical system of the modified device of

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Koide as taught by Tanaka et al. The motivation for doing so would have been to produce the optical scanning device with a reduced size.

5. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koide in view of Maruyama and Tanaka et al., as applied to claims 1-4 above, and further in view of Kamikubo (U.S. 6,115,164).

Koide, as modified by Maruyama and Tanaka et al., discloses all the basic limitations of the claimed invention except for the refractive power characteristics of the f- θ lenses.

Kamikubo discloses a scanning optical system in which the f- θ lenses include a first imaging lens (21), a second imaging lens (22) and a third imaging lens (30), wherein the first and the second imaging lenses have positive power in the main scanning direction while the third imaging lens has a strong positive power in the auxiliary scanning direction such that the balance of the refractive power of the imaging lenses as a whole is maintained (col. 4, lines 40-62).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the set of imaging lenses of the modified device of Koide having the refractive power characteristics as taught by Kamikubo such that the light beam passing through the set of imaging lenses is properly converged in both the main and auxiliary scanning directions to form a beam spot on the surface to be scanned.

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Pertinent Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fisli (U.S. 5,563,647) discloses a method and apparatus for reducing differences in image heights of images generated by plural light beams having dissimilar wavelengths by adjusting the optical path length of each of the light beams measured from the single polygon mirror to the respective photoreceptors such that the optical paths of all the light beams are the same.

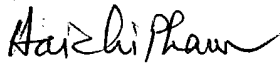
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER

May 17, 2004